

Sacramento Basin-wide Feasibility Study Update

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Presented by:

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2017 ROADMAP

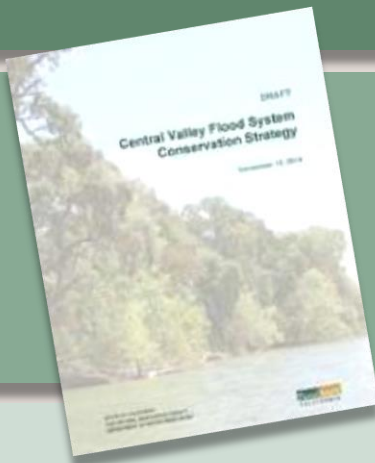


Presentation Outline

- Sac BWFS Purpose and Scope
- Problems/Objectives
- Yolo Bypass Multi-benefit Options
- Evaluation and Comparison
- Initial Tentatively Recommended Option
- Recent Stakeholder Engagement
- Revised Tentative Recommended Option
- Sutter Bypass/Feather River Options
- Next Steps
- Relationship to Other Key Programs (BiOps & Sac River GRR)

2017 CVFPP Update Context

Basin-Wide Feasibility Studies



Conservation Strategy

Regional Flood Management Plans

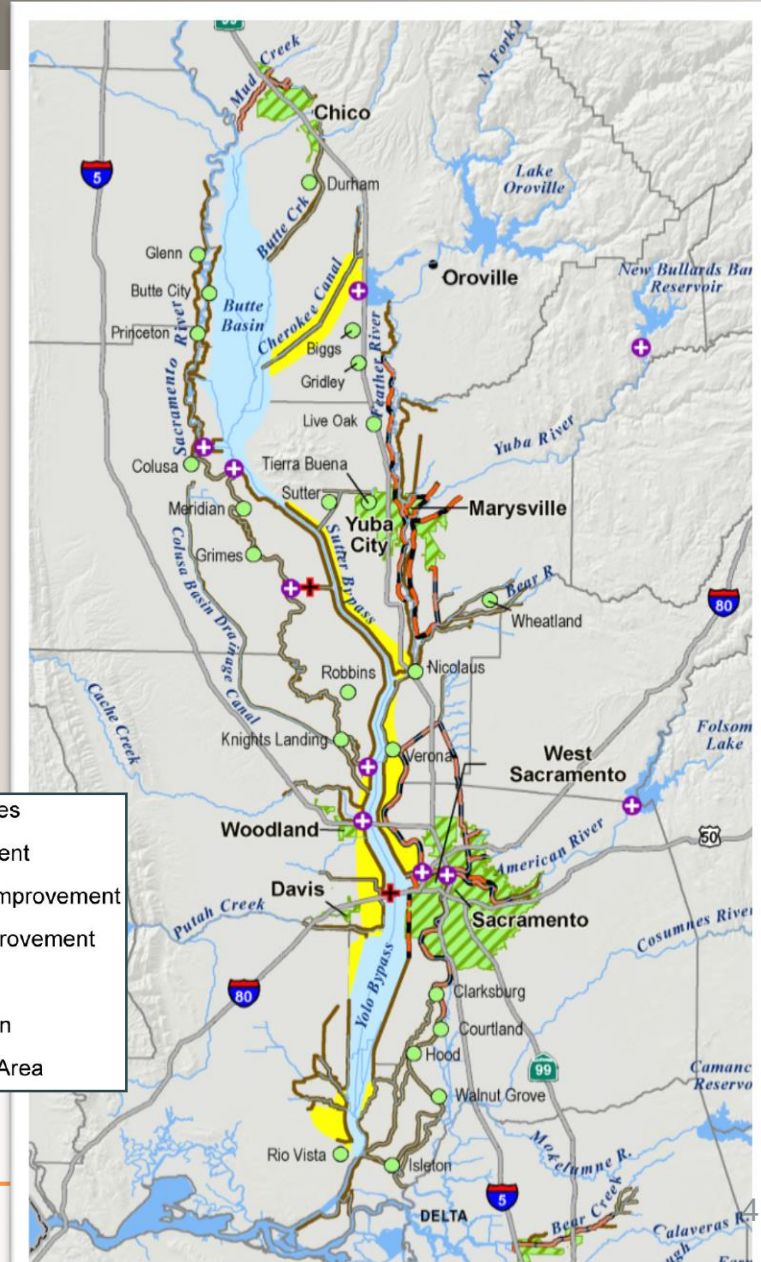


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Sacramento BWFS Purpose and Scope

- Advance ongoing & long-term implementation of SSIA
- Refine scale/location/alignment of weir and bypass improvements; integrate environmental conservation
- Inform 2017 CVFPP update



Sacramento BWFS: Problems & Objectives



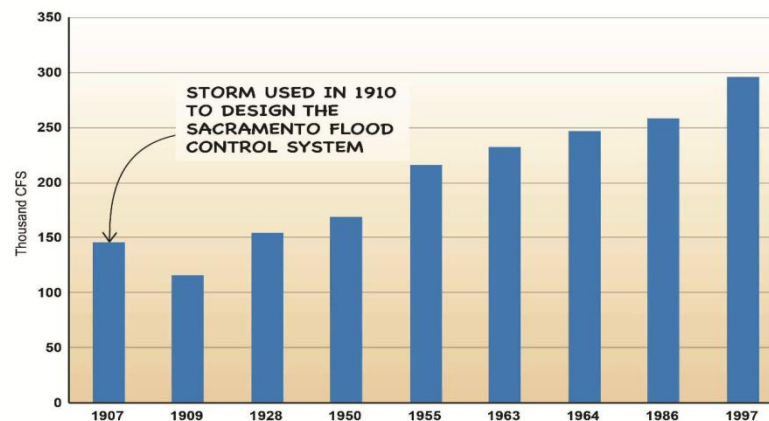
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BWFS Problems

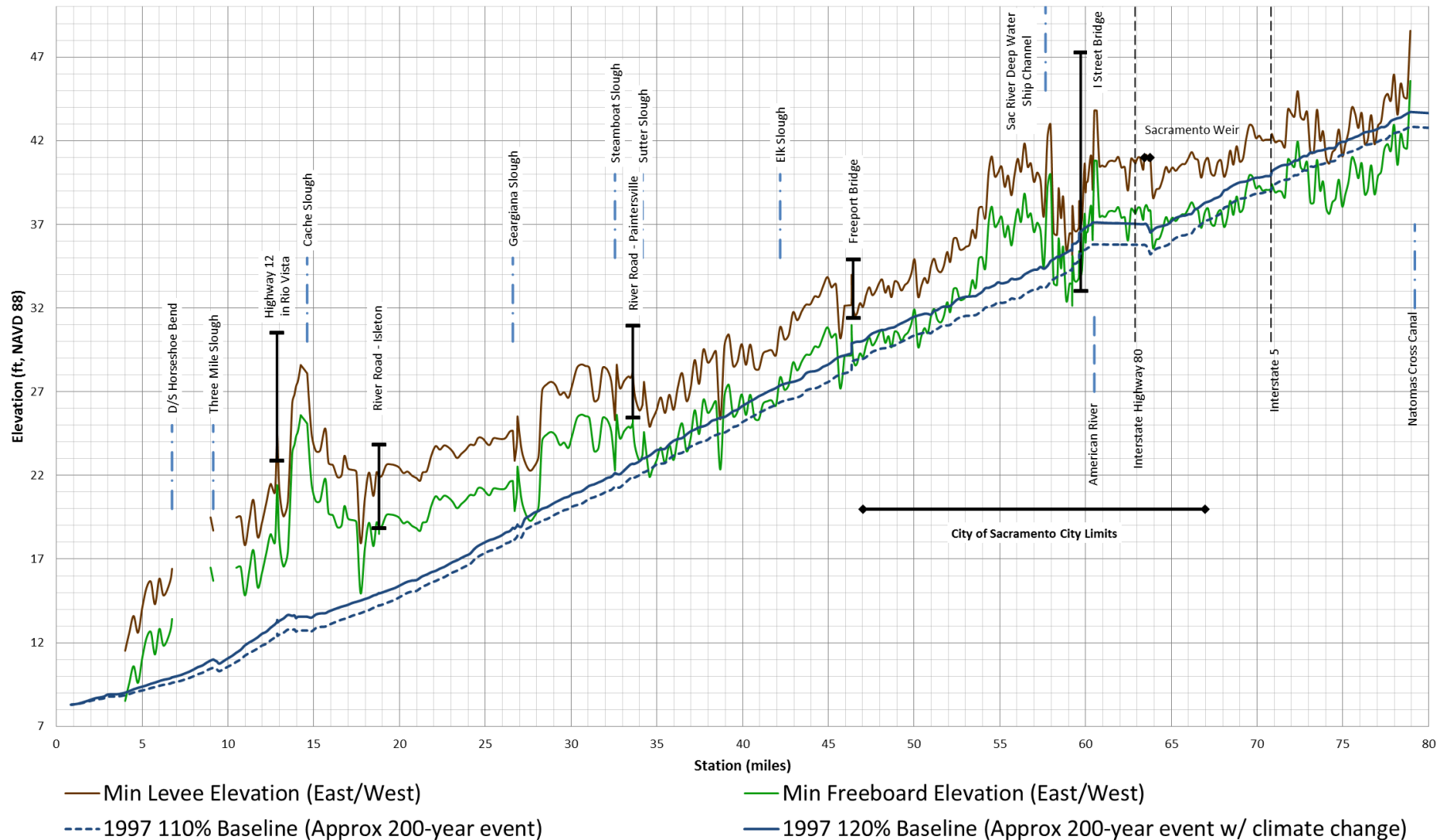
- High risk of flooding with catastrophic consequences to public safety
- Upon completion of on-going projects, remaining flood risks will be more dispersed
- Hydrologic variability and future climate change puts further stress on flood system

Peak Flood Flows on the American River



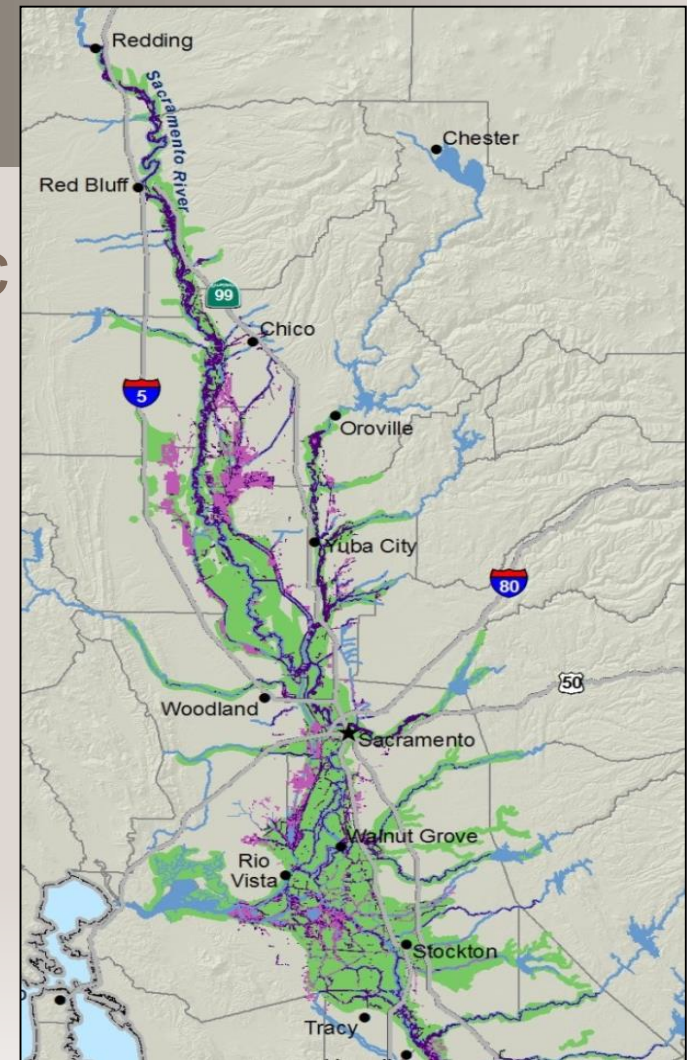
BWFS Problems: Climate Change

Sacramento River (RM80-0) Water Surface Elevations



BWFS Problems (cont.)

- Impaired natural geomorphic processes, eliminated, fragmented, and degraded habitat and other stressors have reduced abundance, distribution, & diversity of native species
- Long-term O&M is difficult, costly, & unsustainable



Historical and Existing
Distribution of Riparian
and Wetland Vegetation

BWFS Goals/Objectives

Goals	Objectives
Improve Flood Risk Management	<ul style="list-style-type: none">• Reduce flood stages in Sacramento River Flood Management System to improve flood system resiliency• Safely convey flows associated with low frequency events through bypass
Promote Ecosystem Functions	<ul style="list-style-type: none">• Improve dynamic hydrologic (flow) & geomorphic processes• Increase & improve quantity, quality, diversity, & connectivity of riverine and floodplain habitats• Contribute to native species populations & overall biotic community diversity• Reduce stressors that negatively affect at-risk species
Improve Operations & Maintenance	<ul style="list-style-type: none">• Reduce obstacles to performing O&M and streamline permitting process
Promote Multi-Benefit Projects	<ul style="list-style-type: none">• Improve water supply, water quality, navigation, recreation, open space, & commercial fisheries

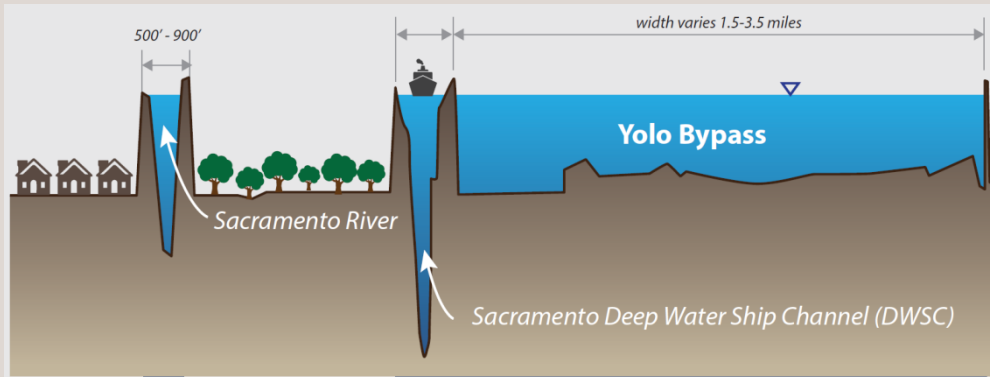
Yolo Bypass Multi-Benefit Options



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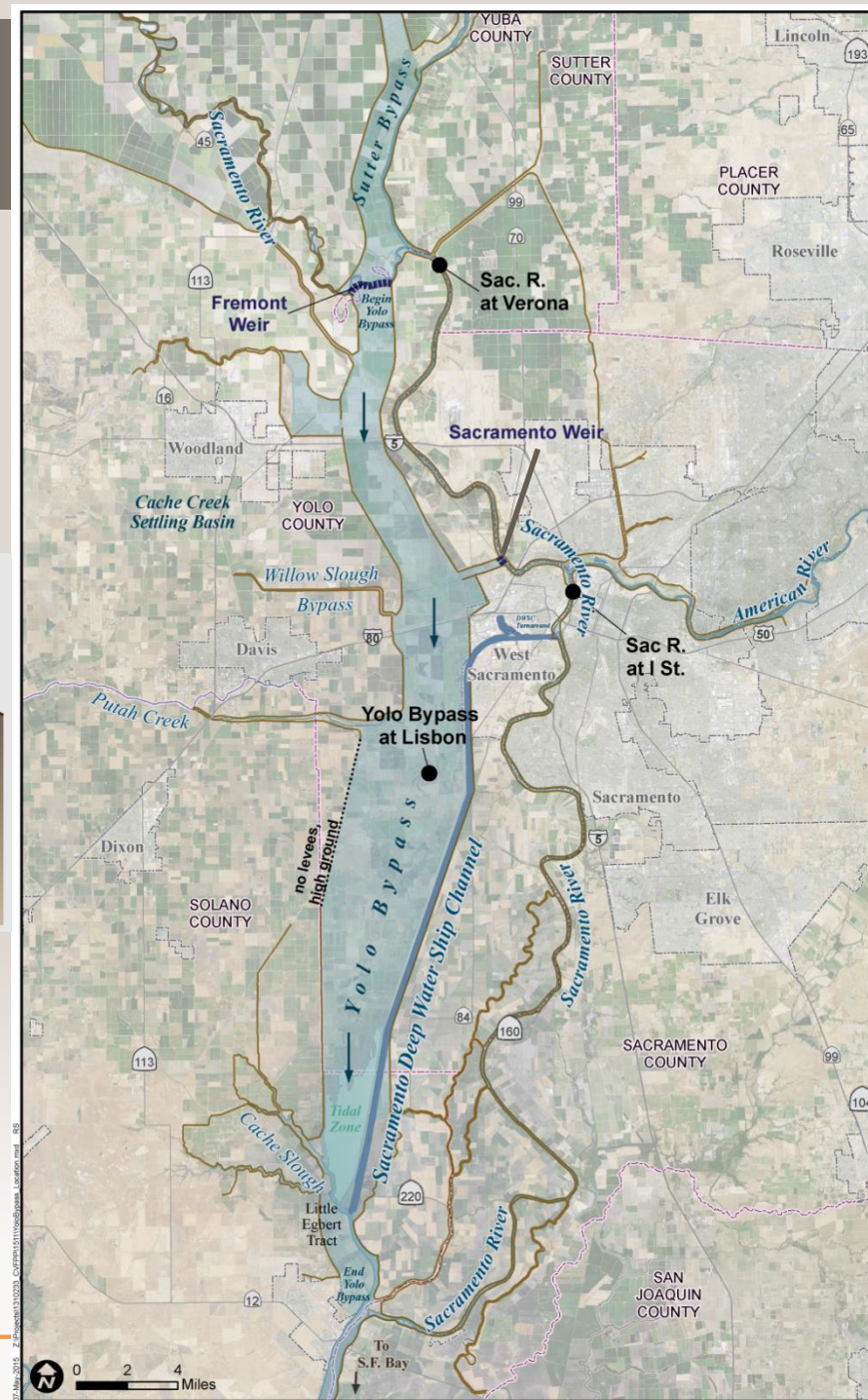


Yolo Bypass



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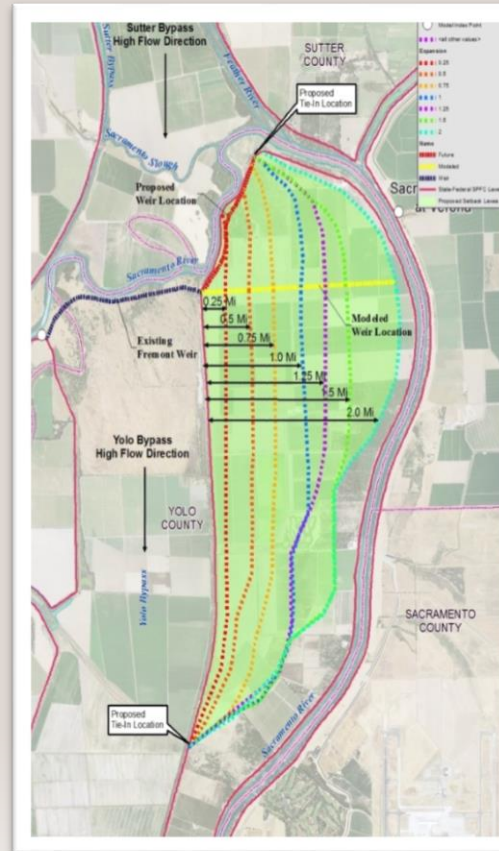
Preliminary Planning

Formulate/Evaluate incrementally and systemwide

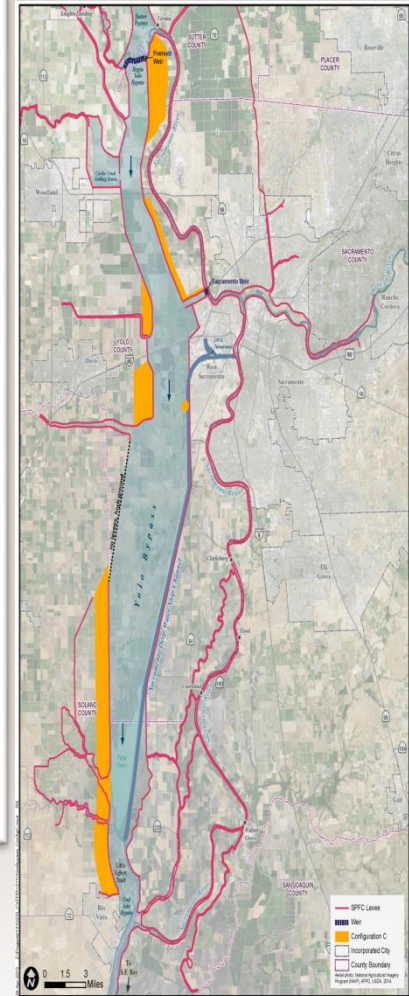
- Formulate/Size Sacramento and Fremont Weir expansions
- Screen different Yolo Bypass Setback configurations
- Formulate/evaluate combinations of weir expansions with Yolo Bypass setbacks
- Initial screening based on stage reduction and cost



Sacramento Weir and Bypass Expansions

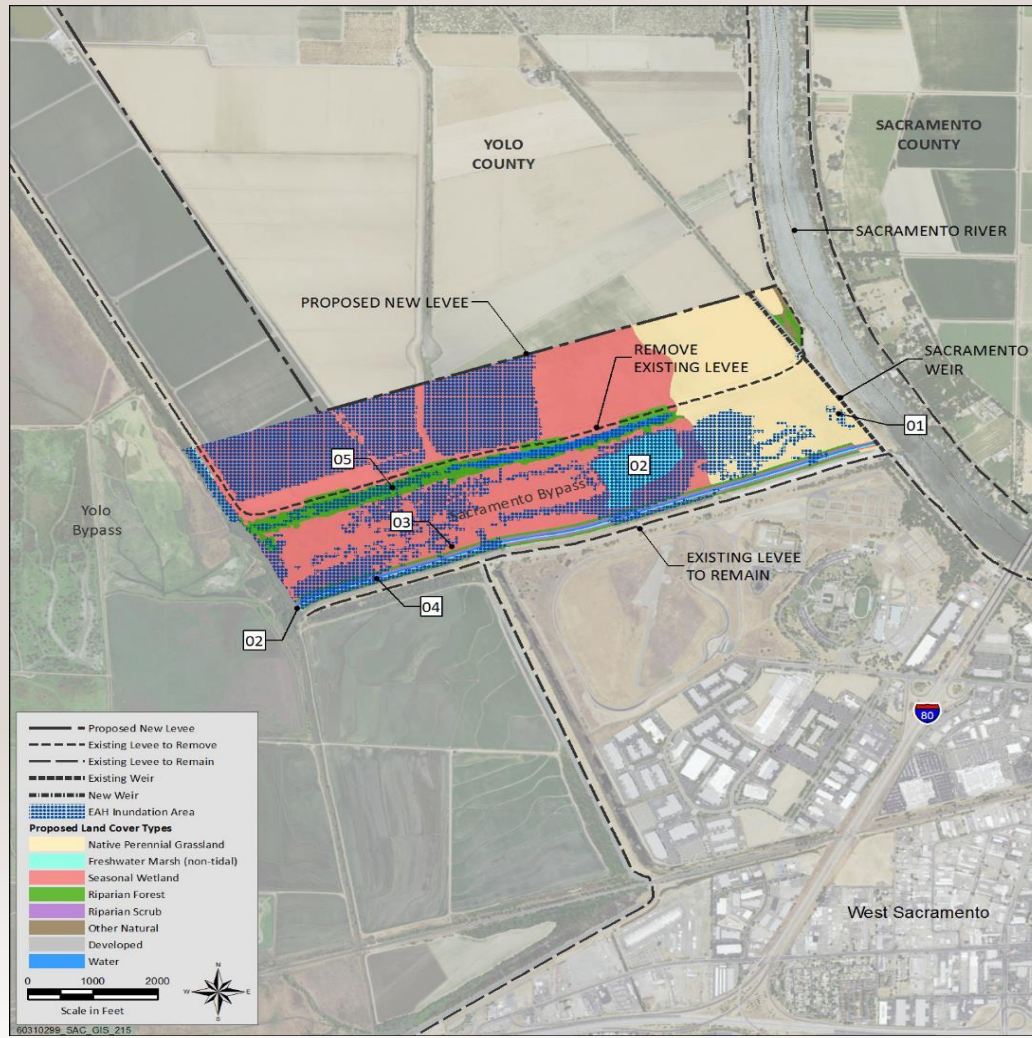


Fremont Weir Expansions



Yolo Bypass Setback Configurations

Ecosystem Integration

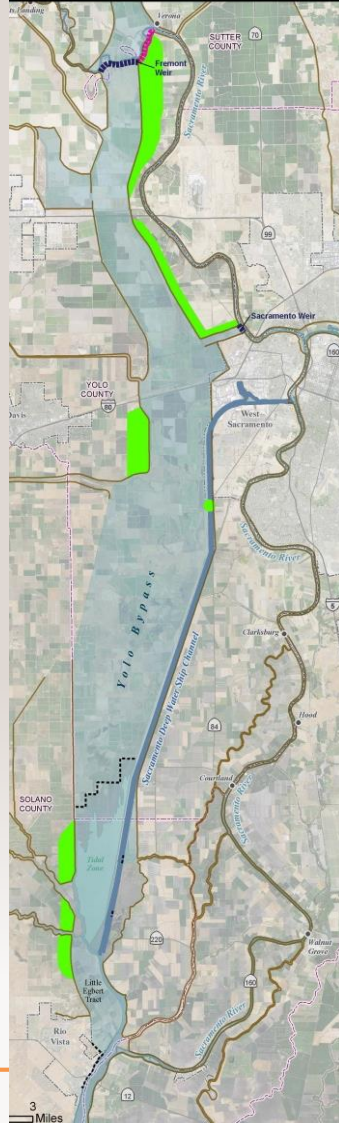


Yolo Bypass Options

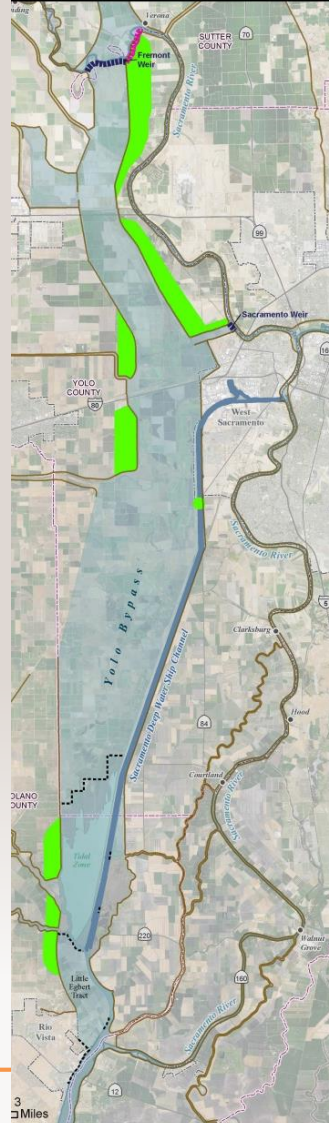
OPTION 1



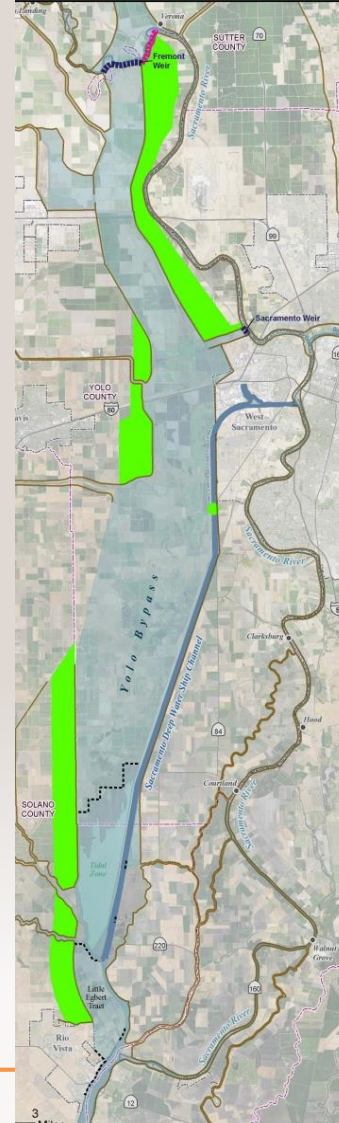
OPTION 2



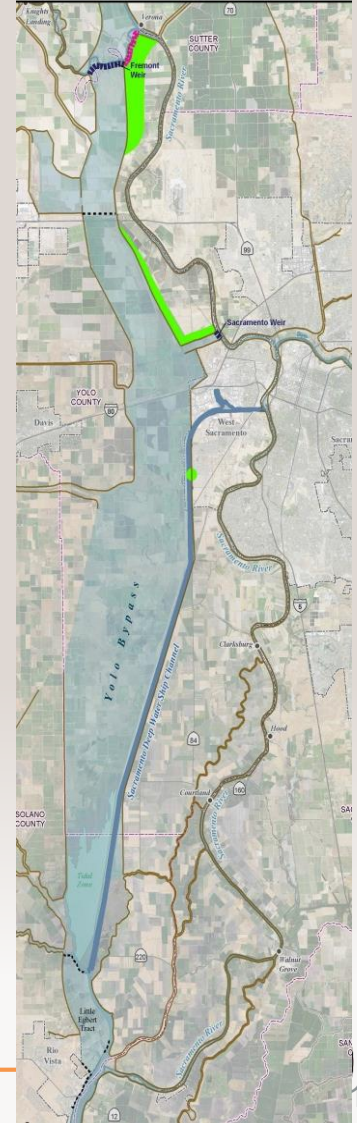
OPTION 3



OPTION 4



REGIONAL OPTION



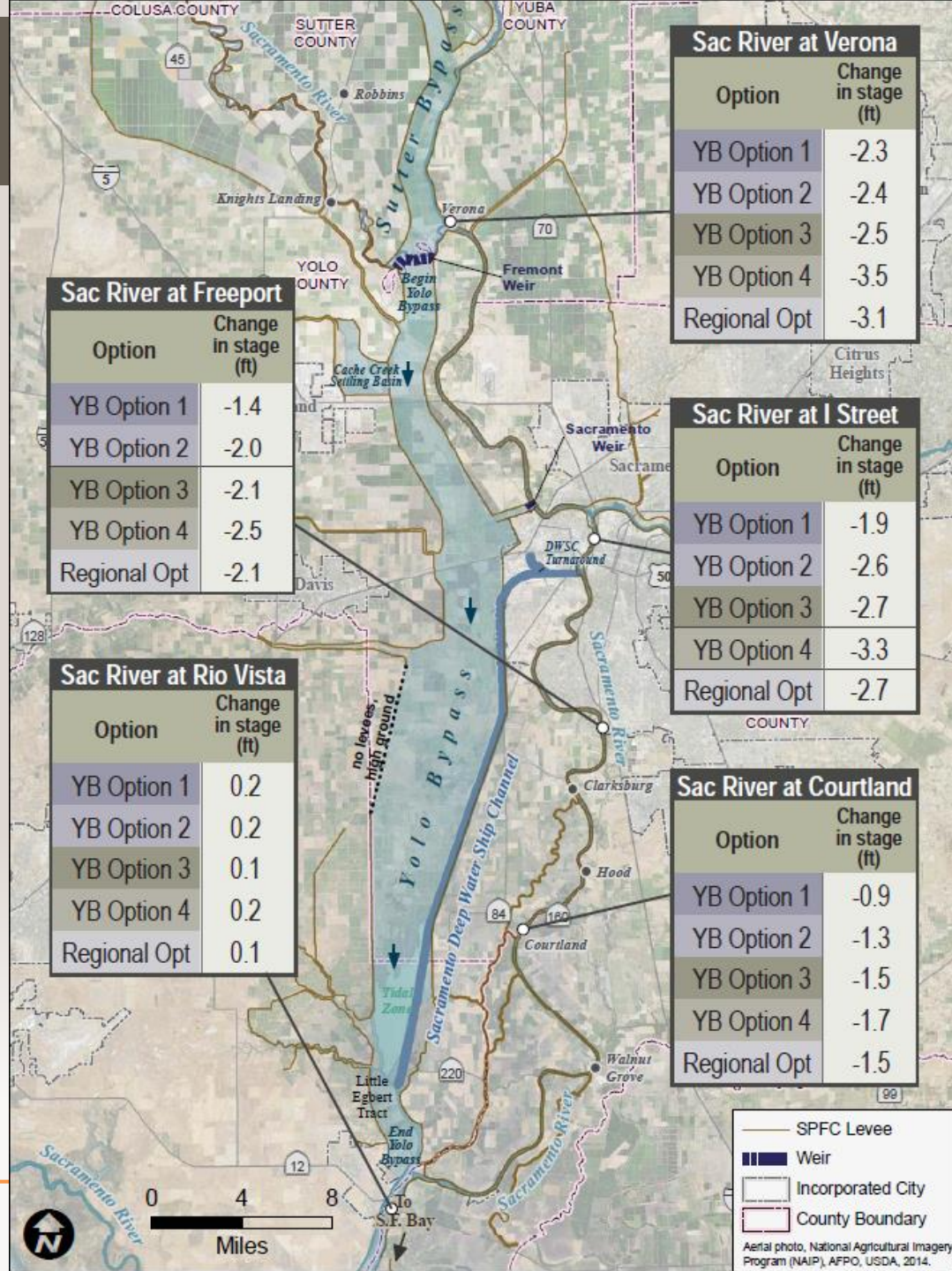
Sacramento BWFS: Evaluation & Comparison



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Sacramento River – Stage Reduction



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Yolo Bypass – Stage Reduction

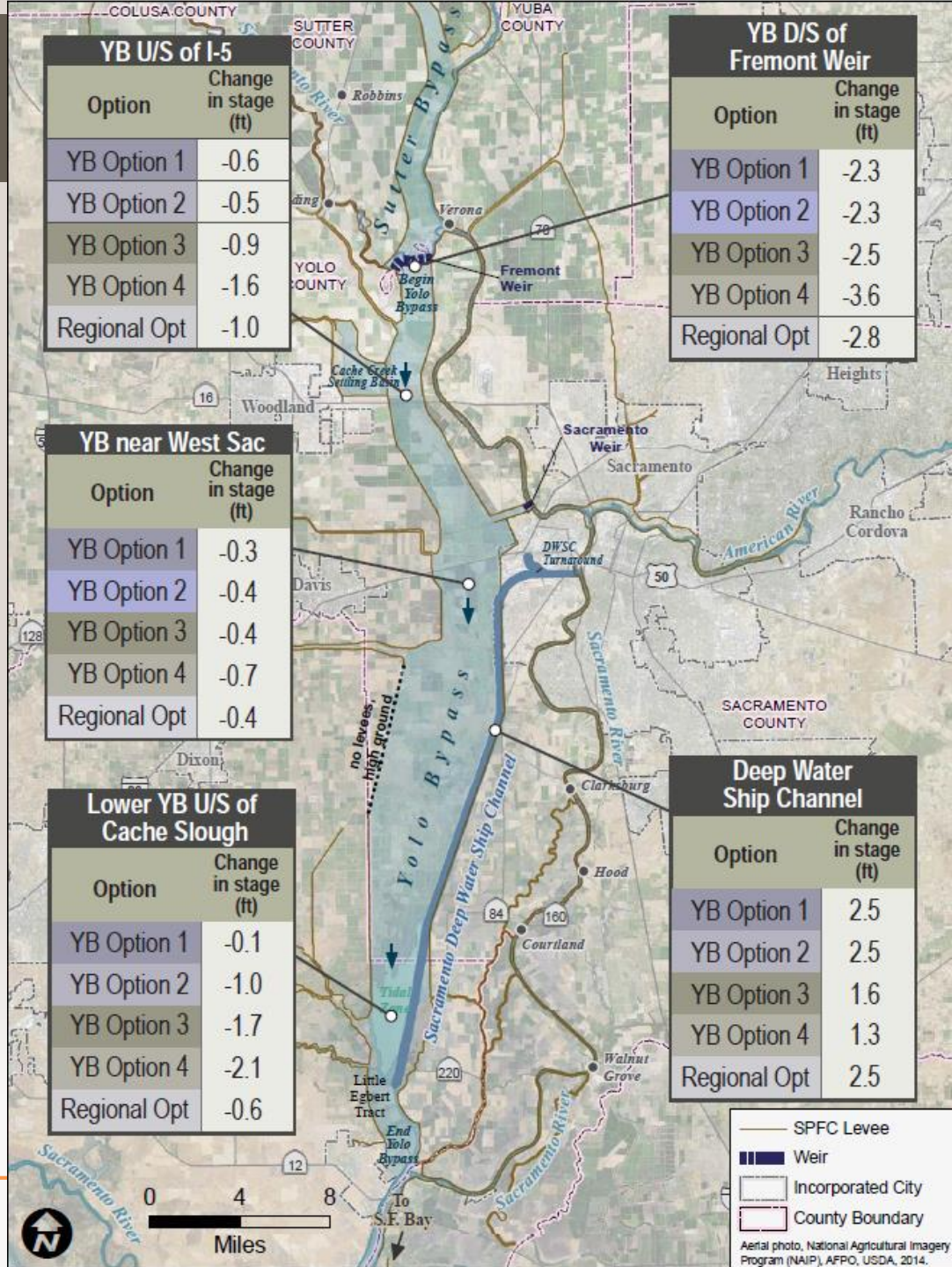
YB U/S of I-5	
Option	Change in stage (ft)
YB Option 1	-0.6
YB Option 2	-0.5
YB Option 3	-0.9
YB Option 4	-1.6
Regional Opt	-1.0

YB D/S of Fremont Weir	
Option	Change in stage (ft)
YB Option 1	-2.3
YB Option 2	-2.3
YB Option 3	-2.5
YB Option 4	-3.6
Regional Opt	-2.8

YB near West Sac	
Option	Change in stage (ft)
YB Option 1	-0.3
YB Option 2	-0.4
YB Option 3	-0.4
YB Option 4	-0.7
Regional Opt	-0.4

Lower YB U/S of Cache Slough	
Option	Change in stage (ft)
YB Option 1	-0.1
YB Option 2	-1.0
YB Option 3	-1.7
YB Option 4	-2.1
Regional Opt	-0.6

Deep Water Ship Channel	
Option	Change in stage (ft)
YB Option 1	2.5
YB Option 2	2.5
YB Option 3	1.6
YB Option 4	1.3
Regional Opt	2.5



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Yolo Bypass Performance Summary – Improve Flood Risk Management

Metric	Option 1	Option 2	Option 3	Option 4	Regional Option
<i>Average Stage Reduction (1997 120% Hydrology – includes climate change)</i>					
Yolo Bypass Urban Areas	(0.67)	(0.71)	(0.91)	(1.34)	(0.79)
Yolo Bypass Non-Urban Areas	(0.35)	(0.50)	(0.67)	(1.48)	(0.45)
Mainstem Urban Areas	(1.86)	(2.41)	(2.52)	(3.17)	(2.75)
Mainstem Non-Urban Areas	(0.39)	(0.58)	(0.84)	(1.03)	(0.86)

Yolo Bypass Performance Summary – Promote Ecosystem Functions

Metric	Option 1	Option 2	Option 3	Option 4	Regional Option ²
Inundated Floodplain Estimated Annual Habitat (acres)	3,042	2,963	3,745	4,856	2,969
Riverine Geomorphic Processes Increase in Natural Bank (mi)	0.92	0.92	0.92	0.92	0.98
SRA Cover (mi)	1.28	1.28	1.28	1.28	0.77
Riparian (acres)	2,182	2,003	2,288	2,821	93
Marsh (acres)	227	592	562	750	316
Fish Passage Barriers	3	3	3	3	3
Primary & Secondary Invasive Plant Species (acres reduced)	65	61	66	66	12

Notes:

1. Results don't include most recently identified ecosystem features.

2. The Regional Option was initially formulated to include ecosystem improvements on the Sacramento River.



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Yolo Bypass Performance Summary – Promote Multi-Benefit Projects

Metric	Option 1	Option 2	Option 3	Option 4	Regional Option
Water Supply Benefit	Low	Low	Low	Low	Low
Water Quality Benefit	Low	Low	Low	Low	Low
Commercial Fisheries Benefit	+	+	+	+	+
Navigation Benefit	0	0	0	0	0
Additional Ag Land Potentially More Frequently Inundated	6.3%	6.3%	7.7%	16.7%	5.6%
Additional Ag Land Potentially Converted to Habitat	2.6%	3.1%	3.2%	3.3%	0.3%
Recreation Benefit (Visitor Use Days)	15,800	18,800	19,600	22,700	1,500
Open Space Benefit (Residential Parcels nearby)	93	93	93	93	93

1. Results don't include most recently identified ecosystem features, which are related to recreation benefits.



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Initial Tentatively Recommended Option



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Yolo Bypass – High Level Summary







Metric	Option 1	Option 2	Option 3	Option 4	Regional Option
Flood Risk Management	Medium	Medium	High	High	High
Ecosystem Functions	High	High	High	Very High	Medium
Other Benefits	Low	Medium	Medium	Medium	Low
Agricultural Stewardship	Medium	Medium	Medium	Low	High
Cost (\$ Billions)	\$1.7-2.2	\$1.8-2.3	\$1.9-2.5	\$2.4-3.1	\$1.6-2.0

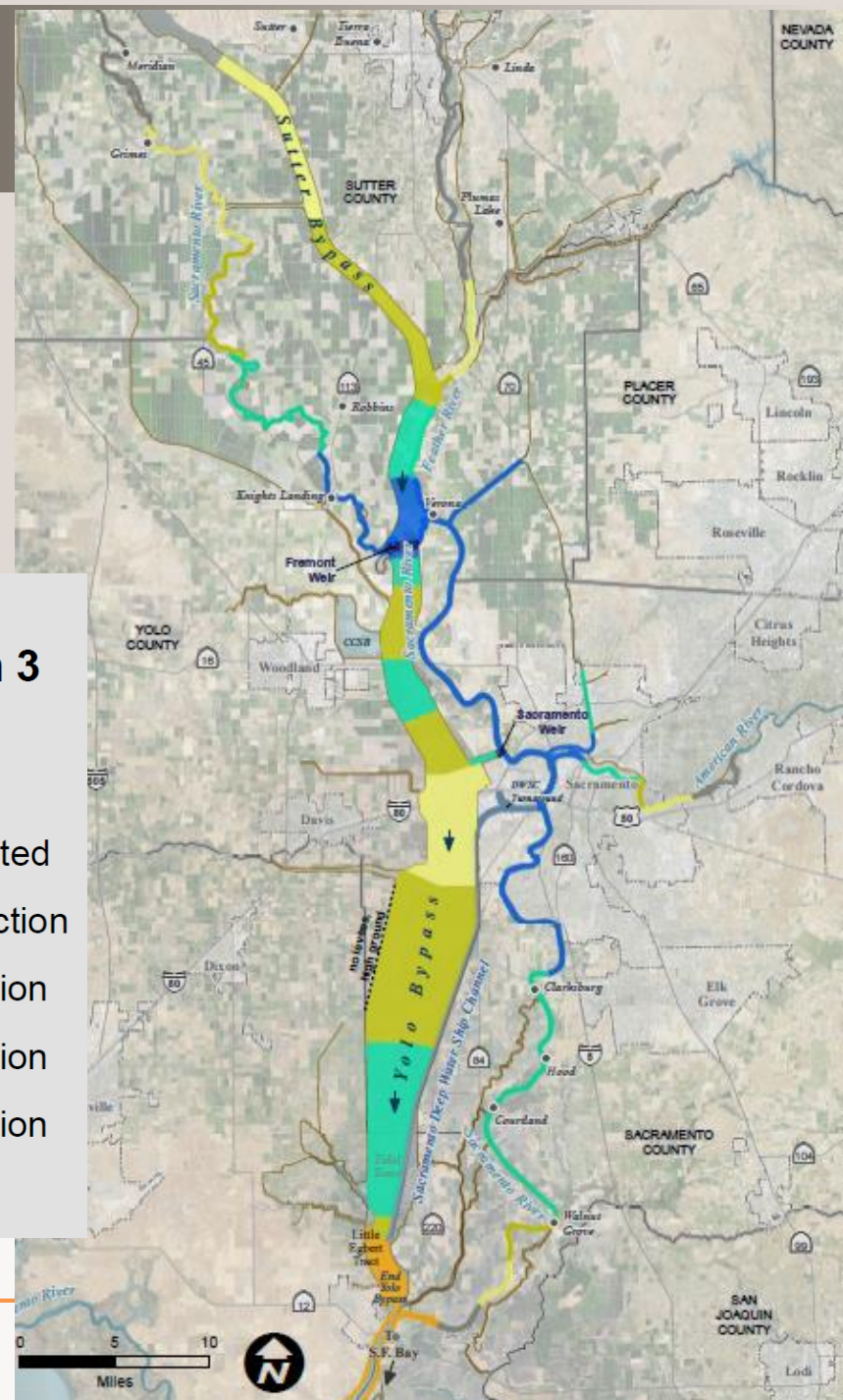
Initial Tentatively
Recommended
Option

Yolo Bypass Option 3 – Hydraulic Effects

Zone of Influence - Yolo Bypass Option 3 1997 120% Event

Stage Change

-  Increase but Mitigated
-  0.01 to 0.2 ft Reduction
-  0.2 to 0.5 ft Reduction
-  0.5 to 1.0 ft Reduction
-  1.0 to 2.0 ft Reduction
-  ≥ 2.0 ft Reduction



Recent Stakeholder Engagement



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Sacramento BWFS – Recent Stakeholder Engagement on Tentative Recommended Option

- Regional Flood Management Planning (RFMP)
 - Lower Sacramento River/Delta North
 - Mid & Upper Sacramento River
 - Feather River



- Environmental NGO's



- Resource Agencies



- Agricultural Stakeholders



- Central Valley Flood Protection Board



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Revised Tentative Recommended Option



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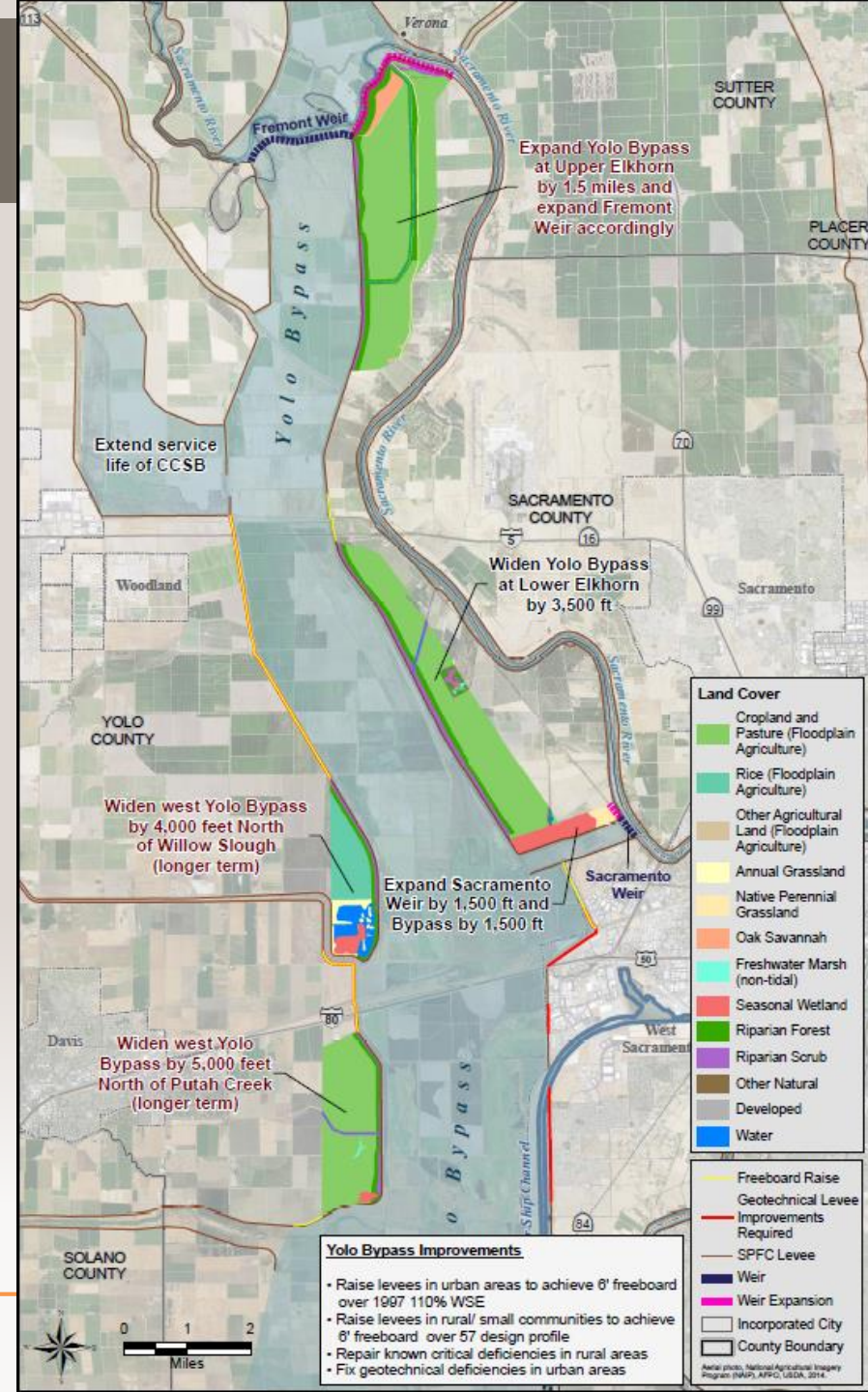


Revised Tentative Recommended Option

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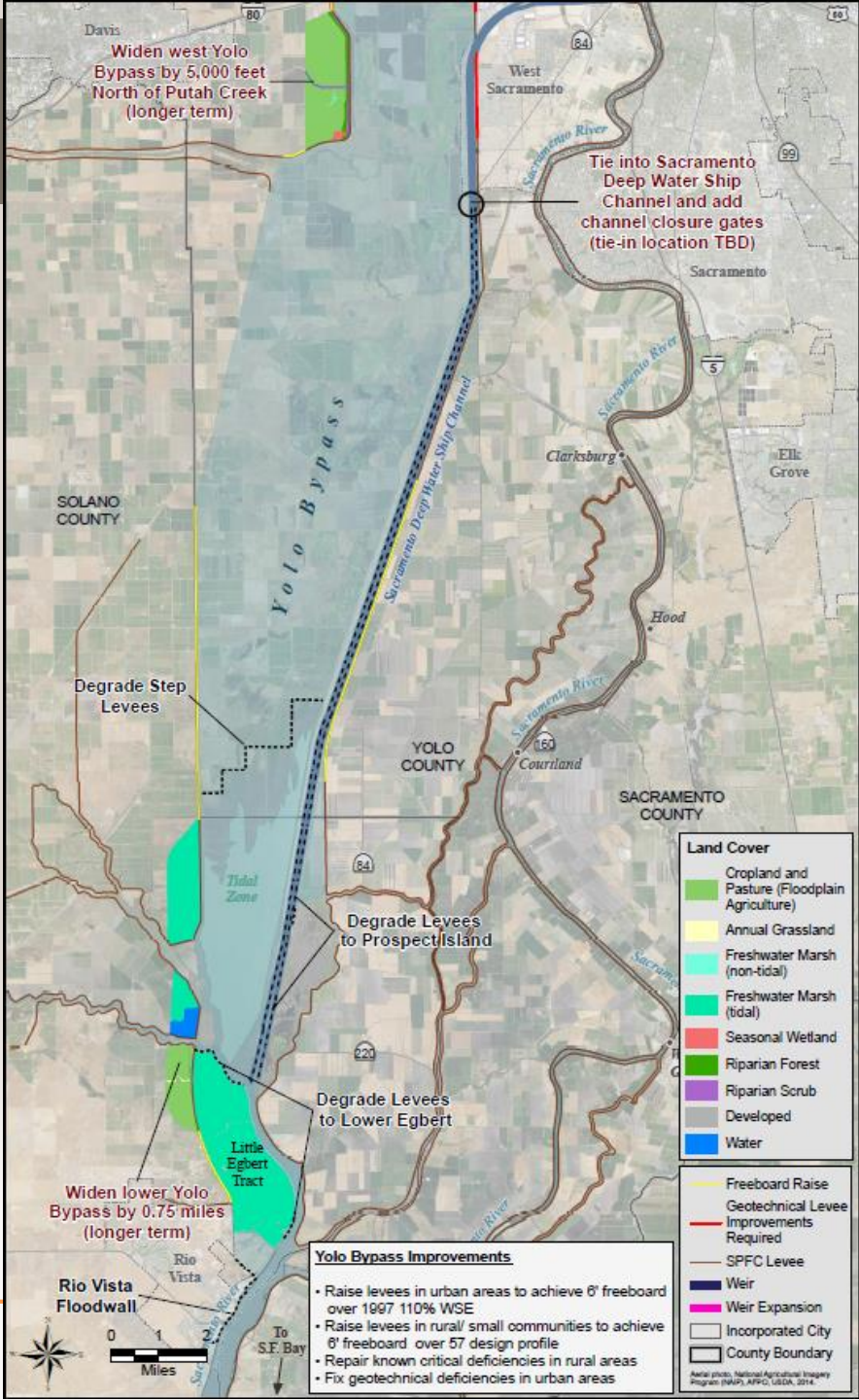


Revised Tentative Recommended Option

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Feather River/Sutter Bypass Options

- Sacramento BWFS studying array of options
- Sacramento BWFS will document results of study
- No recommended option to be selected

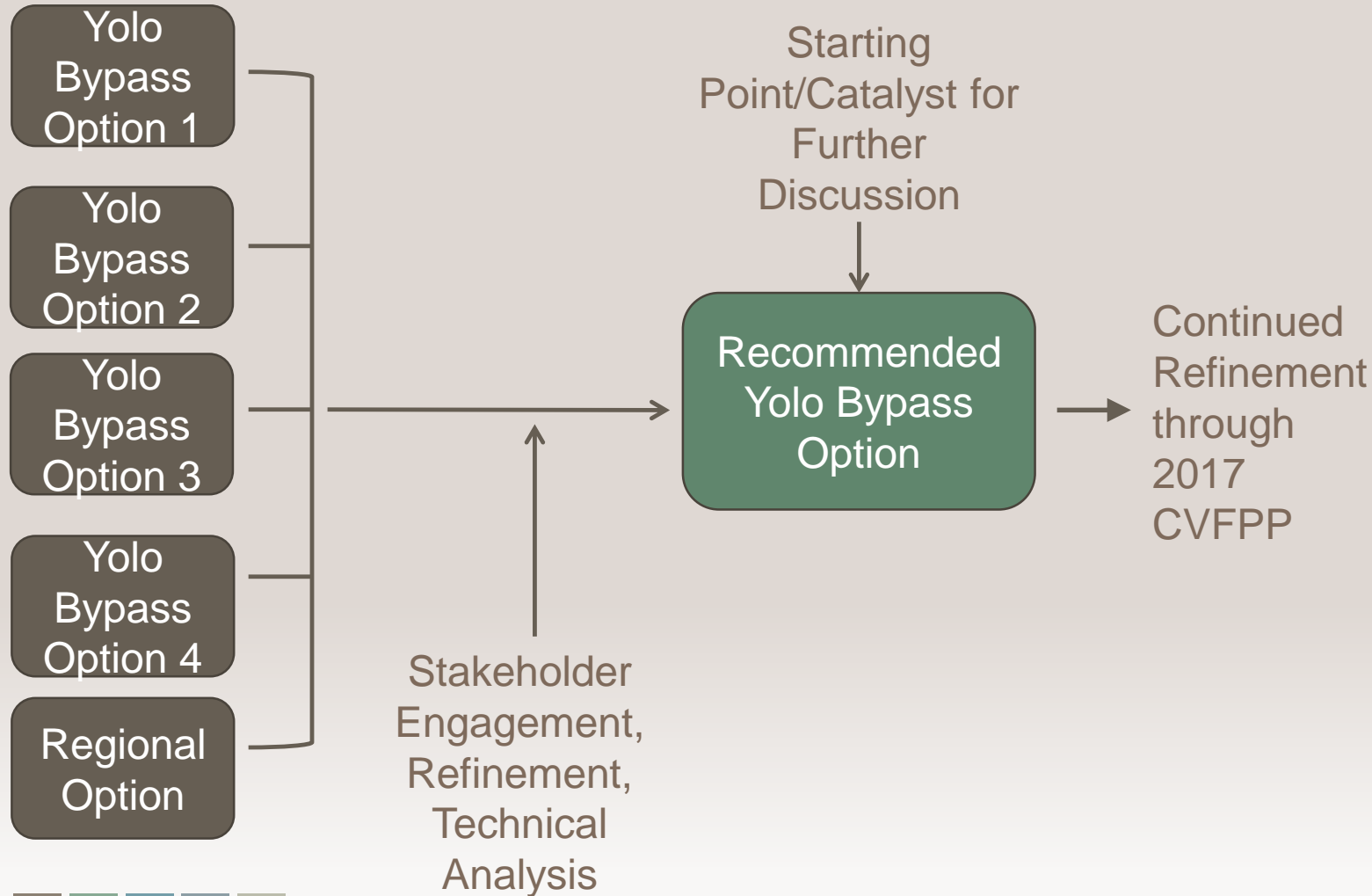
Next Steps



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Recommended Yolo Bypass Option



Sacramento BWFS: Next Steps & Schedule

- Further Yolo Bypass Coordination/Refinement through partnership

Jan/Feb 2016: Draft
Sac BWFS



Mar/Apr 2016:
Revised Draft Sac
BWFS



2017: Update of
CVFPP

Relationship to Other Key Programs

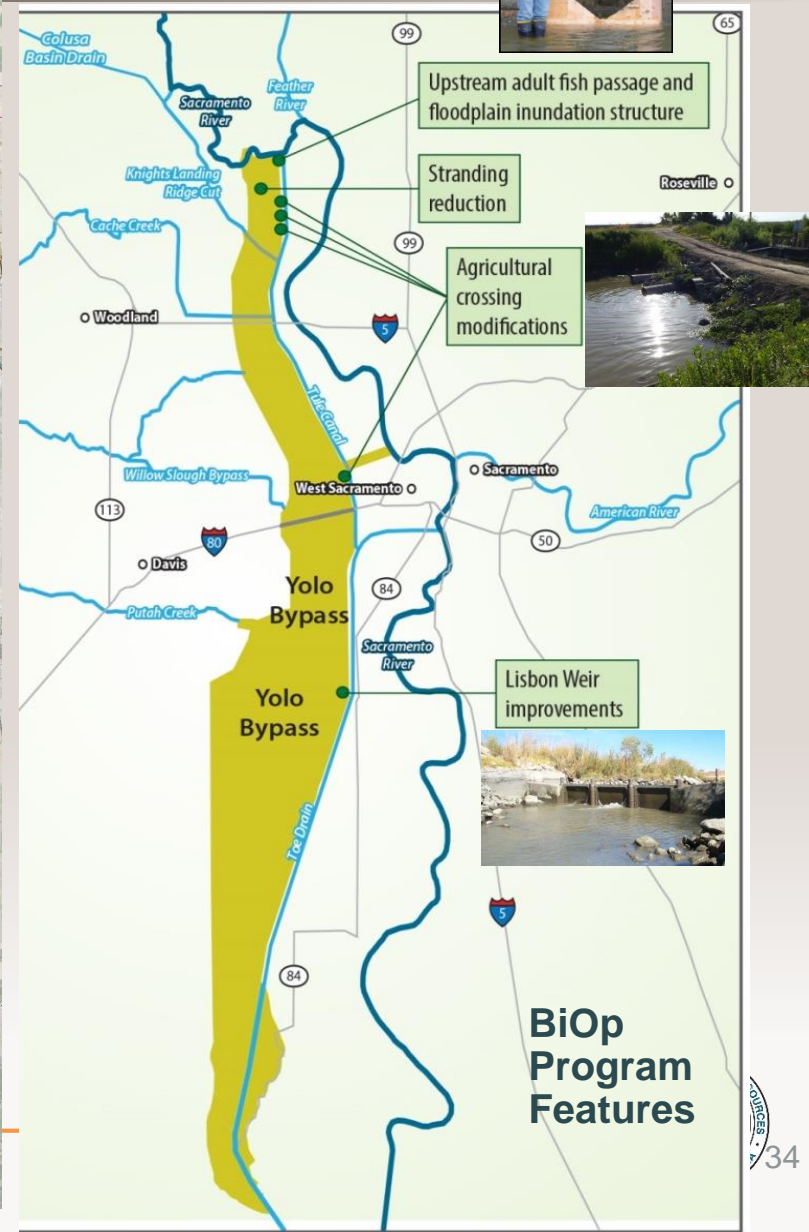
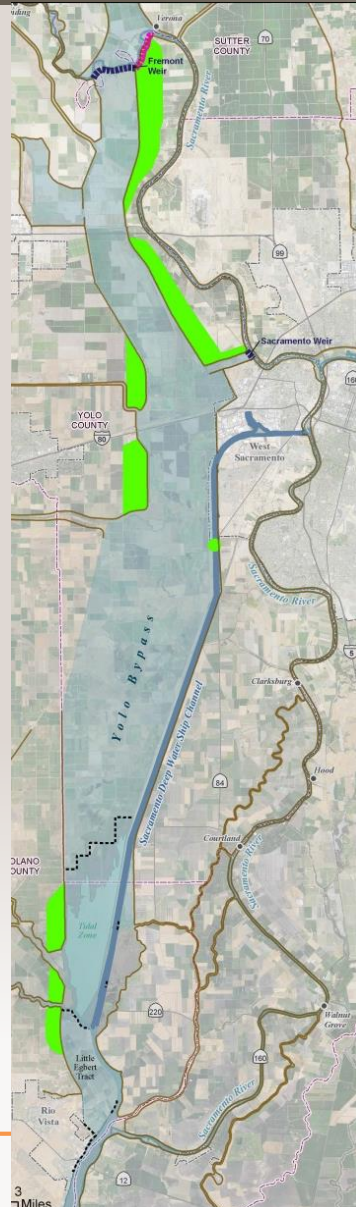


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Flood and BiOp Alignment

- Integration of BiOp features with BWFS Yolo Bypass Options is complementary and additive
- Sharing of constraints, objectives, and evaluation criteria to support integrated planning



Sacramento River GRR

- General reevaluation of design and operation of Sacramento River Flood Control Project
- Flood risk management and ecosystem restoration feasibility study
- Develop a Chief's Report recommending project for authorization by Congress
- BWFS Recommended Option will be included as a Locally Developed Plan

Moving Towards the 2017 CVFPP

CVFPP 2017 Update



COLLECTION

OF POTENTIAL CVFPP MANAGEMENT ACTIONS

- BWFS
- RFMPs
- Actions and refinements from:
 - Resource Agencies
 - Regulatory Agencies
 - NGOs
 - Others

ASSESS

PROPOSED MANAGEMENT ACTIONS

- Consistency with SSIA within SPFC
- Consistency with State priorities
- Contribution to CVFPP goals
- Potential for bundling to achieve broader State interest

SELECTION

OF ACTIONS WITH POTENTIAL STATE INTEREST

- Organized by basin and region
- Characterized by potential to meet intended outcomes
- Characterized by scale and implementation timeline

DEVELOP

AND EVALUATE PORTFOLIOS

- Holistically contribute to intended outcomes of flood management in California
- More resilient to future stressors than individual actions
- Cost effective
- Value of whole is greater than the sum of parts
- Diverse geographies, sizes, and scales

CVFPP UPDATE

RECOMMENDED INVESTMENT PORTFOLIOS

- Near and long term
- Regional and systemwide portfolios
- Portfolios include some or all types of improvements:
 - System-scale
 - Urban
 - Small communities
 - Rural-agricultural
 - Residual risk management

**IMPLEMENT
CVFPP
Recommendations**

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Questions and Discussion



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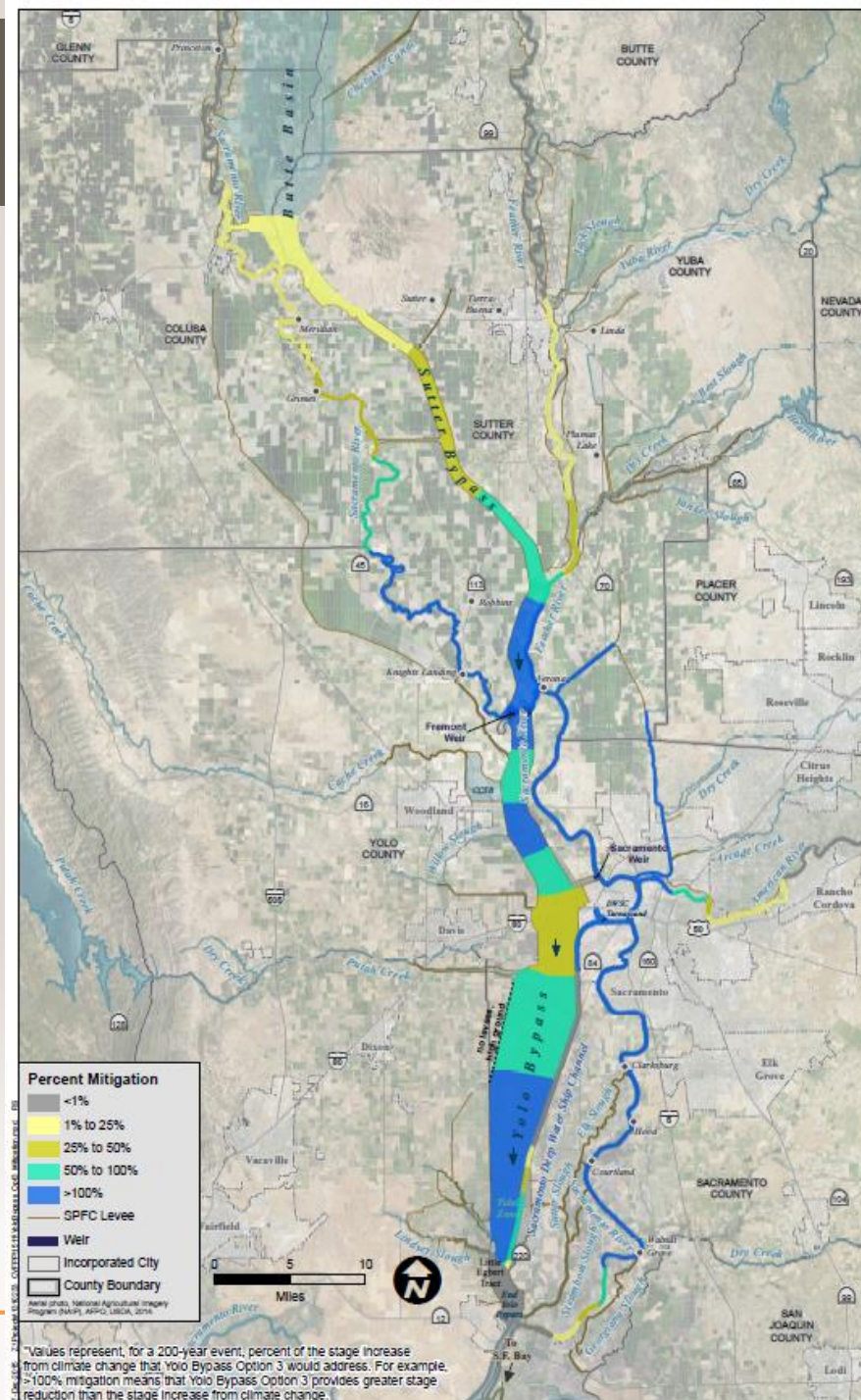
Appendix Slides



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Climate Change Mitigation



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